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NOTES ON GEOGRAPHIC DISTRIBUTION

Filling gaps on the distribution of *Arabis nova* Vill, *Thlaspi coclearioides* Hook.f and Thomas, *Gentiana venusta* Wall. ex Griseb and *Primula involucrata* Wall.ex Dubey in Gurez valley, Kashmir, India

Javaid M. Dad and Anisa B. Khan *

Pondicherry University, Department of Ecology and Environmental Sciences. 605 014, Puducherry, India.
* Corresponding author. E-mail: *anisabasheer@yahoo.co.in*

ABSTRACT: Gurez valley represents the northernmost remote area of Kashmir, India. The mountainous terrain of the valley is characterized by lofty mountains and long flat grasslands loaded with plant species richness. Four species of vascular plants unreported from the valley are discussed. These taxa have their major distribution in the alpine grasslands which act as summer grazing grounds for the livestock of the pastoral nomads.

Kashmir abounds in a rich variety of plant species richness and has always attracted the attention of botanists and naturalists. But a number of areas remained largely unexplored due to rough topography, arduous tracks, lack of transport etc. Gurez valley is one such area which has not been explored in the past and remained untapped till date. No exclusive work has been done on the flora of this area and only a few occasional references were found in literature (Vigne 1842; Clarke 1876; Duthie 1893, 1894). However, the last study on the flora of this valley by Naqshi and Shoukat, 1993 has found several new plant records and has confirmed the existence of other taxa.

Between 2008-2010, during the snow free summer months of June to October, three alpine grasslands viz. Viji, Patalwan and Minimarg of the Gurez valley, Kashmir, India were surveyed and studied for their floristic composition. A perusal of the earlier literature shows that a few plant species, we came across with, have not been previously reported from the valley and thus qualify as new plant records for Gurez. A brief description about these plant species is provided below.

***Arabis nova* Vill.** (Syn. *A. auriculata* Lam., *A. cadrnea* Boiss., *A. montbretiana* Boiss., *A. sinaica* Boiss.)

Tall erect annual, pubescent herb with short stellate hairs. Single erect stem with few basal leaves (3-10). Basal leaves spathulate, toothed, sessile, stalked or shortly petiolated. Flowering April to June. Previously reported from Zaffarkhani Nullah (2300 m) and Dara (2200 m). Type collected from high altitude grassland Patalwan (Gurez), late May 2009, forest shade part of a small elevated area between the camping sites of shepherds. Its habitat is fairly attractive to grazing livestock.

***Thlaspi coclearioides* Hook.f.and Thomas**. (Syn. *Draba himalayensis* Klotzsch)

Small glabrous perennial herb. Branched with many spathulate and long petiolated basal leaves; upper leaves few (3-5) and sessile. Flowers white; flowering June-July. This herb has a wide distribution in the grasslands and is seen on various landforms such as valley bottom, lower and stable slopes and rough rocky and stony slopes during mid June 2009 at Patalwanand Minimarg, at altitudes ranging between 3,100-3,600 m.

***Gentiana venusta*, Wall, ex Griseb.** (Syn. *Ericala venusta* G. Don., *Gentianodes venusta* G. Don.

Small perennial herb with a simple but high prostrate stem. Basal leaves rosulate; cauline leaves spathulate and marginate. Inflorescence terminal with dense shoots bearing 1-3 flowers. Flowers almost stalk less with wide sinus between neighboring lobes. Flowering late July to September. The species is endemic to Kashmir Himalayas (Dhar and Kachroo 1983). Type collected from Patalwan, August 2009, 4010 m. on a mountain top which overlooks the adjacent Viji grassland. The area has a steep slope with a high percentage of small stones and boulders and remains snow bound for almost seven to eight months.

***Primula involucrata*, Wall.ex Dubey.** (Syn. *Primula munroi* Lindley)

A glabrous perennial herb. Leaves at the base with stalks larger than the blades, leathery, oblong or oblong- heart shaped and minutely toothed. Flowering stem slender; longer than the stem and bears 3-6 flowers. Flowers usually white but sometimes tinged pink and flowering July to August. Very nearly related to *Primula sibirica* but differs from it in having larger leaves, longer leaf-stalks and larger flowers. Out of the 21 species found in Kashmir, 18 have subalpine and alpine range (Dhar and Kachroo 1983). This species is common to the eastern Himalayas and China. Type collected from the Minimarg from moist areas along the edge of a snow fed stream which drains into the adjacent forest area.

The addition of these four species viz. *A. nova, T.*

coclearioides, *G. venusta* and *P. involucrata* exclusively from the surveyed grasslands to the floral list of Gurez valley, reveals that the floral inventory of the area is not yet complete. Systematic surveys of the high altitude vegetation that overcomes the climatic and other logistic problems and record seasonal variation in the occurrence of various early and late season plants are likely to add many more species.

At species level, based on our field survey, we plotted the abundance values (number of plants) of these species along an altitudinal gradient. The results reflect the pronounced species dominance in terms of their distribution pattern, numerical strength and habitat preference. Of all, *T. coclearioides* depicted wider amplitude and hence is more frequent while *G. venusta* is restricted towards the higher elevation belts and hence least frequent (Figure 1). Likewise *A. nova* is also distributed chiefly in the lower elevational belts of these grasslands. These observations connote that each of these species occupies a definite position along the elevational gradient.

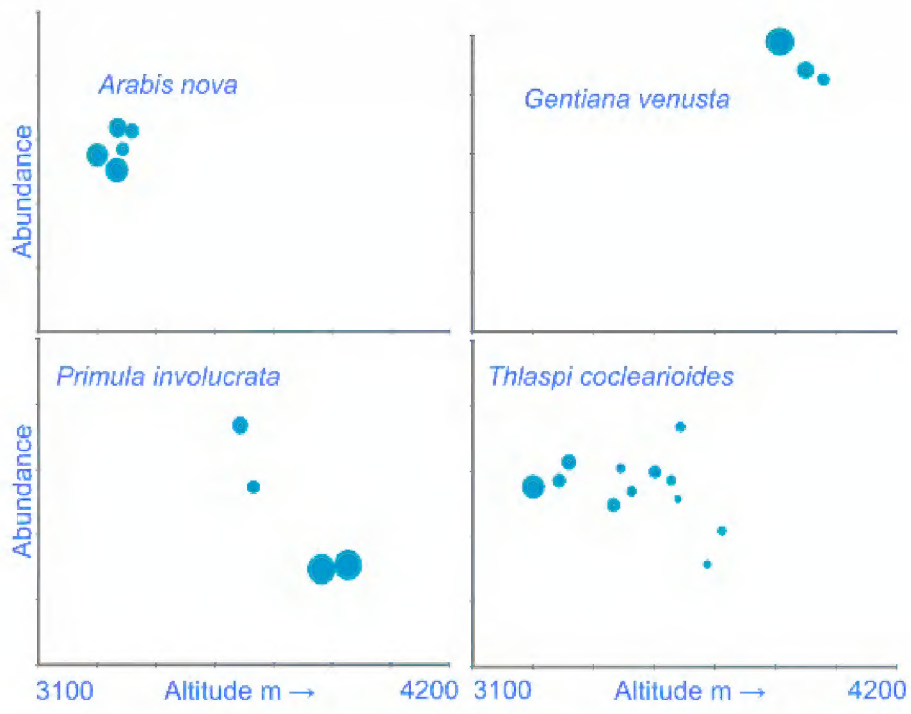

FIGURE 1. Correspondence analysis performed on the abundance values of the described species along the altitudinal gradient in the three surveyed grasslands at Gurez valley, Kashmir. Circle area is proportional to species abundance value.

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